REMARKS

In the Office Action, claims 1-3, 12 and 18 were rejected under 35 USC §102(e) as being anticipated by Piety et al. Claims 1-12, and 18-21 were rejected under 35 USC §103(a) as being unpatentable over Root in view of Meyer. Claims 13-17 were rejected under 35 USC §103(a) as being unpatentable over Root in view of Meyer and further in view of Lofall.

The Examiner has rejected claims 1 to 3, 12 and 18 on the basis that they are anticipated by Piety. The Piety patent relates to a handheld ultrasonic receiver. An ultrasonic sound wave transmitter 34 may be turned on and placed inside a pipe, tank or other sealed environment that it is desired to check for leaks. Once the ultrasonic sound wave transmitter is activated the operator of the ultrasonic monitoring system can use the ultrasonic sensor in the elongate housing to detect any ultrasonic sound waves being emitted from the ultrasonic sound wave transmitter that are escaping the sealed environment.

The monitoring system of this patent is not concerned with monitoring particulate matter within a working machine or container. If the transmitter was located inside a pipe or container having particulate matter it would be destroyed and would therefore clearly not work. If the transmitter was located on the

outside of the container or pipe it would not be able to locate leak holes in th pipe or container.

The present invention is for a system for monitoring mechanical waves from a machine regardless of whether the machine is stationary or moving. Any sensors are located on the outside surface of the machine and the transmitter transmits electrical signals representing the sensed mechanical waves from the machine (not a transmitter) over a period of time so that a full picture of events occurring within the machine can be displayed on a display means).

To more clearly distinguish the claimed invention from the cited reference, claim 1 has been amended to incorporate the following features:

i. That the machine is moving or stationary.

ii. The or each sensor is located on the outside surface of the machine.

iii. That the transmitter transmits electrical signals representing sensed mechanical waves over a predetermined period of time.

The invention as claimed, including the above features, enables continuous on line monitoring of events occurring inside a machine having particulate matter therein. This information enables characteristics of particular matter to be monitored along with performance of the machine. Furthermore internal wear on the

machine can be closely monitored and predictions to be made about when maintenance and repairs need to be conducted. There is nothing in the Piety patent which remotely suggests the above combination of features.

The Examiner suggests that claims 1 to 12 and 18 to 21 are rejected on obviousness grounds in view of a combination of the Root and Myer patents.

The amendments to claim 1 should more clearly distinguish the invention from bot cited patents taken in combination. To begin with neither patent discloses the ability of a sensor to be located on the outside surface of a moving machine.

The Root patent centres around control of a mill using, in part, information obtained from a microphone mounted off the mill. The Root patent has only one microphone which uses unspecified signal conditioning to produce a clean signal representative of actual changes in the sound produced in the mill. These changes correspond to the operating conditions of the mill. The system as disclosed is entirely hardwired. Furthermore, the microphone merely monitors sound level and triggers a monitor switch 62 or 62' if the sound level reaches a predetermined limit level. The microphone does not collect "information about what is happening inside the machine and is unable to process and display such information to represent one or more parameters indicative of mechanical waves emitted for the machine over a predetermined

period of time". It would appear that the microphone must be located away from the surface of the machine as it would be expected that a microphone located in direct contact with the surface would suffer from severe vibrational problems which would make it ineffective. There is no suggestion of placing it on the surface of a moving machine and to one of ordinary skill in the art one would expect that this would cause more problems and therefore such an option would not be a natural step to try.

With regard to the Myer patent, this discloses the use of an accelerometer mounted on a stationary housing of a rotating unit, e.g. a bearing, to produce an electrical signal corresponding to sensed bearing vibrations. If the received signal is above a threshold level a defect signal is generated and transmitted via radio modulated to a fixed and unique frequency for each unit being monitored. The transmitter is powered by a capacitor that discharges when triggered by the defect signal. The transmitted signal is received in a central room via an antenna and demodulated to determine the modulating frequency which then identifies the unit producing the defect signal using a lookup table. The significance of this invention is that the sensing unit only transmits information when a fault condition is found. Even then the unit only transmits for approximately one second. Thus both the Myer and Root patents are not concerned with monitoring events occurring within a machine to obtain an overall picture of what is

occurring within the machine. Instead both references are concerned with monitoring a fault condition and producing an alarm in the case of the Myer patent that is indicative of a vibration measure exceeding a preset level.

It is not apparent how a combination of both patents would teach one of ordinary skill in the art to locate a sensor on the external surface of a rotating or stationary machine and then to sense acoustic waves and transmit electrical signals representing the sensed mechanical waves over a predetermined period of time so that one or more parameters indicative of mechanical waves emitted over this predetermined period of time can be displayed on a display means.

The idea of having a sensor located on a moving machine is a significant departure from the prior art and resulted in the ability to sense greater detail in mechanical events occurring within the machine over a period of time and thus obtain a great deal more information on what is occurring within the machine and operational characteristics of the machine.

The dependent claims introduce additional features relating to the general concept covered in claim 1. As an example, claim 11 covers the feature of the accelerometer transmitting data relating to the frequency of vibrational events occurring within the machine and the amplitude of the vibrational events at particular locations within the machine to the transmitter. There

is no previous disclosure of any monitoring system which encompasses all this data and thus processes this data to monitor different characteristics of the machine and matter which is located within the machine. In its simplest form the invention can merely look for a single parameter, but in its most sophisticated form is able to monitor a number of parameters with resulting significant impact on minerals processing machines in just one example.

By collecting a much data as possible using the system as claimed, it is possible to optimize operation of machines carrying particulate matter and reduce expensive downtime for machine repairs.

Claims 13 to 17 have been rejected on obviousness grounds over a combination of Root, Myer and Lofall. The Lofall patent does not appear to add any additional information which predicts any of the distinguishing features cited above. The Lofall patent instead relates to a method of diagnosing vibration data and therefore fails to add missing information relating to the system and particularly relating to the at least one sensor on the outside of the rotating machine and particular data transmitted for processing and display on the display means.

Based on the foregoing amendments and remarks, it is respectfully submitted that the claims in the present application, as they now stand, patentably distinguish over the references cited

and applied by the Examiner and are, therefore, in condition for allowance. A Notice of Allowance is in order, and such favorable action and reconsideration are respectfully requested.

However, if after reviewing the above amendments and remarks, the Examiner has any questions or comments, he is cordially invited to contact the undersigned attorneys.

Respectfully submitted,

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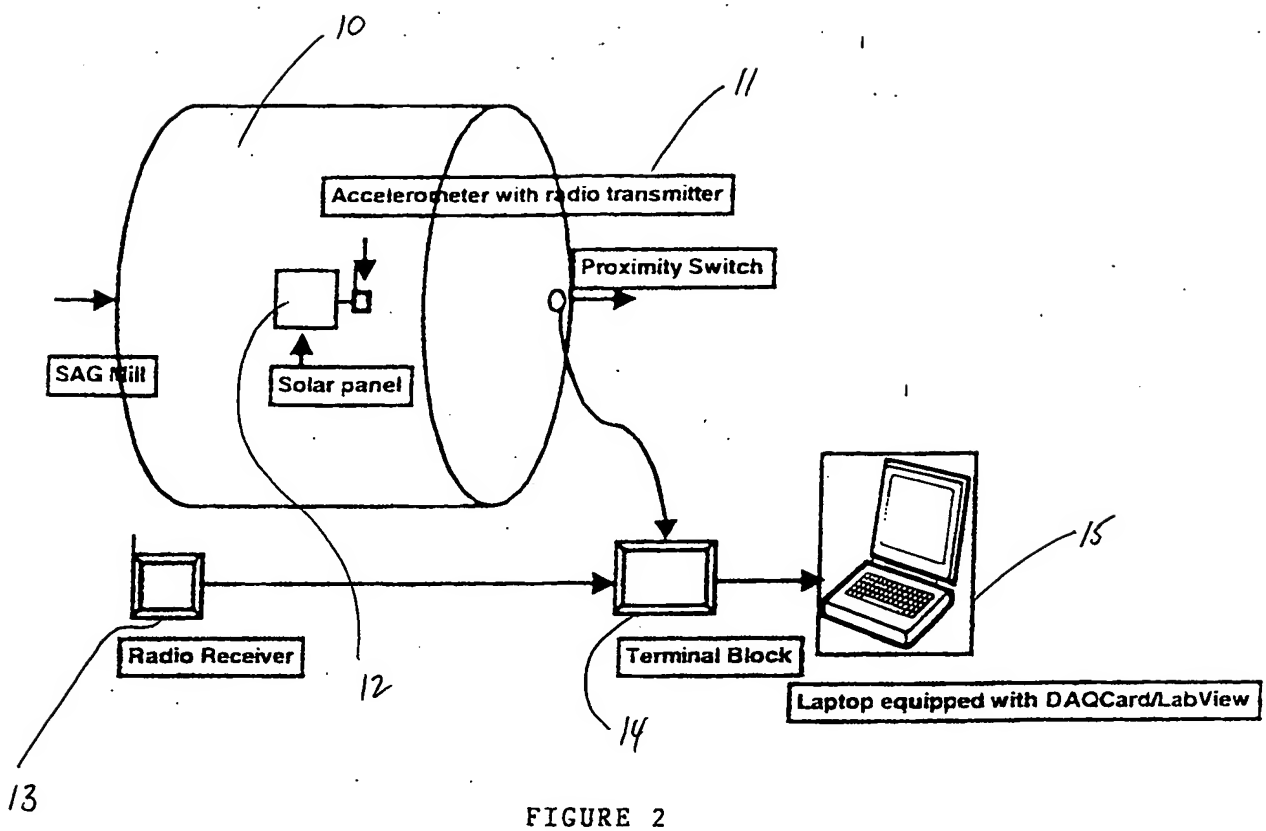

FIGURE 2